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**No. 11**



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## APPLIED SCIENCES

### SHIP GAS TURBINE MOTIVE POWER PLANTS DEVELOPED

Beijing JIANCHUAN ZHISHI [KNOWLEDGE OF SHIPS] in Chinese No 3, Jun 79  
pp 22-23

[Article by Chen Zhao [7115 2507]: "Development of Ship Gas Turbine Motive Power Plants"]

[Text] In the last issue this publication introduced a principal direction of future development of gas turbines for ships from the angle of the development of the engines themselves, that is, the development of a special-purpose engine with a core assembly borrowed from an aircraft turbofan. The present article will discuss the future development of gas turbines for ships from the angle of the development and application of installations.

#### Employment of Combined Power Plants

With improvements in performance, the second generation of marine gas turbines have begun to be used as navigational engines or all-purpose engines. This kind of installation can be divided into two types:

One type is called the all-combustion combined installation. It is composed of a low power gas turbine used as a cruising engine or all-purpose engine and a high power gas turbine used as an acceleration engine.

The other type is called the all-combustion power plant. It is composed of several high power all-purpose gas turbines of the same model.

In the future, the principal way in which all-combustion propulsion installations will be employed will develop along the lines of the all-combustion combined installation, for the following reasons:

1. With regard to displacement navigating ships that are propelled by screws, the propulsive power they require is proportionate to the square of the ship's speed, and the cruising speed of modern high-speed military ships is much lower than their top speed, so cruising power is only one-fifth to one-third of full power. Moreover, of total navigation time, the

time spent navigating at cruising speed or below generally exceeds 90 percent of the total navigation time. These are two very important characteristics of high speed military ships.

2. With regard to gas turbines, as the load decreases, fuel consumption (consumption of fuel per horsepower-hour) increases rapidly. Because of this, when the cruising power output of each gas turbine is about one-third of its full power, fuel consumption increases 30 percent or more over its fuel consumption at full power. By employing an all-combustion combined installation pairing a high power engine and a low power engine, this deficiency can be avoided. The low power engine can be operated at its rated power most of the time, and this can save 10 percent or more of the cruising fuel consumption.

All-combustion combined installations can be divided into two types according to the different ways in which the large and small engines are operated. One type is where the large and small engines are operated together when the ship is at top speed, in which case the low power engine is used as an all-purpose engine. This type is called an "and" installation. The other is where the low power engine is used only as a cruising engine, and the high power engine is operated alone at top speed, so the large and small engines are operated alternately. This type is called an "or" installation.

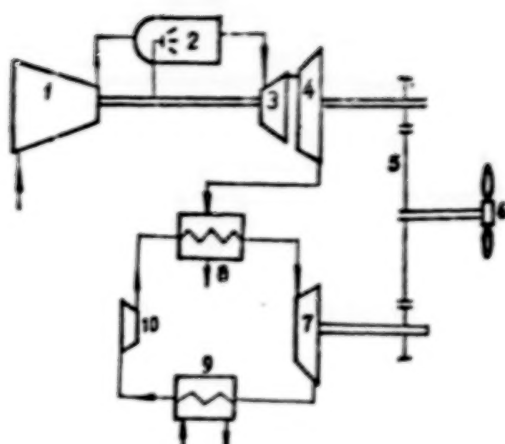
In actual application, selection of the type of operation for an all-combustion combined installation is principally determined by the power ration between the high power engine and the low power engine. If this relative value is less than 20 percent, the "or" installation should be used, because if the "and" installation were used, the increase in top speed would be slight, and the parallel transmission installation and controls would be much more complex, so it would not pay. If the relative value exceeds 30 percent, the "and" type of installation can be used to employ the power of the low power engine fully in increasing the ship's top speed. If the relative value is between 20 and 30 percent, the type of installation can be selected according to the requirements of the ship's specific tactical use.

#### Employment of Waste Heat Boilers

The exhaust temperature of gas turbines is relatively high, resulting in a great heat loss, which is a principal obstacle to reducing the fuel consumption of gas turbines.

To further reduce the fuel consumption of marine gas turbines, foreign countries are exploring and studying simple steam-gas combined circulation installations like that shown in the illustration:





简单蒸汽—燃气联合循环装置

1. Compressor
2. Combustion Chamber
3. High Pressure Turbine
4. Power Turbine
5. Parallel Transmission Installation
6. Propellor
7. Steam Turbine
8. Waste Heat Boiler
9. Condenser
10. Water Supply Pump

### Simple Steam-Gas Combined Circulation Installation

A waste heat boiler is installed behind the gas turbine to utilize the turbine exhaust to heat water and steam in the boiler, and from this is derived medium and low pressure steam to drive a steam turbine. The steam turbine drives the propellor together with the gas turbine through a parallel transmission installation, and some are used to power ship's generators and compressors.

Because the exhaust temperature of steam turbines is low, there is very little waste of heat, so this kind of simple steam-gas combined circulation shows very good results economically, producing power increases of about 25 percent as compared with a pure gas turbine under similar circumstances of fuel combustion.

To distinguish this from a steam and gas combined installation in which there is no connection through heat circulation, this kind of steam and gas combined installation in which the gas turbine is primary and which has both a mechanical connection and a connection through the heat circulation is called a steam and gas composite installation.

Technologically, a steam and gas composite installation is relatively easy to achieve, the principal technological key being the need to develop a waste heat boiler with compact structure and high heat exchange efficiency.

In the steam and gas composite installation, because the temperature inertia of the steam system is relatively high, it is sluggish in reacting to changes in the operating circumstances of the gas turbine. For example, if the gas turbine is opened to full emergency power, it is a dynamic characteristic of the changeover that it will be many minutes before the steam system can respond. So the flexibility of the gas turbine is influenced to a very small degree by the steam system.



Of course, this kind of composite installation, as compared to a pure gas turbine, is structurally much more complex, and is both bigger and heavier. This may create a certain amount of difficulty in installing, it as well as in using and maintaining it, and there must be increases in control and maintenance personnel. However, because of its good results in reducing oil consumption, (if combined with the previously listed patterns of use and rational measures, the reduction in oil consumption is even more striking), it is very suitable for application in large and medium size surface ships with relatively roomy engine compartments. We can affirm that with the development of matters pertaining to ships, this kind of steam and gas composite installation will certainly be used more and more widely.

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Beijing ZHONGHUA KOUQIANGKE ZAZHI in English Vol 13, No 1, Sep 78; No 2, Dec 78

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CSO: 4008

AUTHOR: None

ORG: This Journal

TITLE: "The Architectural Society of China Convened the Second Session of the Fourth Standing Committee (Enlarged)"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79 pp 1-2

ABSTRACT: This article reports the convening of the Second Session of the Enlarged Fourth Standing Committee of the Architectural Society of China on 1-5 April 1979 at Hangzhou, and attended by 82 committee members throughout China. On the basis of reviewing the achievement of the society since the liberation, eradicating the evil-doings of the "Gang of Four", and clarifying right and wrong, the session emphasized the urgency of a unified correct understanding in the restoration of the reputation of the society, and reorganization and reactivation of the activities of the society as a preparation for the forthcoming convening of the Fifth National Conference. A Conference for the establishment of an Architectural History Academic Committee, and a restorative conference

[Continuation of JIANZHU XUEBAO No 4 Jul 79 pp 1-2]

of the Architectural Construction Academic Committee, both of the Architectural Society of China, were also convened simultaneously on 28-31 March 1979 at Hangzhou, and attended by 143 representatives from various related units from various parts of China.

AUTHORS: SHEN Yadi [3088 0068 6611]  
LU Cangxian [7120 0221 6343]

ORG: Both of Beijing Civil and Architectural Engineering Society

TITLE: "The Beijing Housing Design Competition"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 3-7, 19

ABSTRACT: The authors introduce the floor plans, measurement and facilities of 18 prize-winning residential housing designs out of the 534 designs entered in the June and November 1978 Beijing housing design competition. Classified under seven categories, the prize-winning designs are characterized by their 5-6 storied housing units of 2.7 meters height per story, full extension and utilization of living area, enlarged windows, practical and economical room arrangement, land economy, adaptation to mechanized construction process, and capability to withstand earthquakes measuring 8 on the Richter scale. The competition was sponsored by the Beijing Civil and Architectural Engineering Society.

AUTHOR: PENG Zhongping [7458 6945 1627]

ORG: None

TITLE: "New Approach to Environment, Space and Architectural Style"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 8-16

ABSTRACT: From an analysis on the architecture of some formerly and recently constructed high-rise hotels and guest houses in the scenic resort areas of Beijing, Hangzhou, Guangzhou, Guilin and others, the author discusses the significance and principles of harmony between building appearance and proportions and their environmental landscapes, the adaptation of the spacial arrangement of public facilities, such as dinning halls, lobbies, etc. to the convenience of human activities, and the incorporation of Chinese traditional courtyard landscaping and interior decorations to modern architectural designs and plannings.

AUTHOR: QIN Guangan [2953 7070 3227]

ORG: None

TITLE: "Development of Industrial Building Systems is an Effective Approach to Realization of Building Industrialization"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 17-19

ABSTRACT: In a discussion on the controversy over the development of industrial building systems as an effective means of realizing building industrialization in China, the author maintains its correctness based on the successful experiences abroad, so long as local characteristics and specific requirement are not neglected in the overall standards and entirety of the industrial building systems being developed.

AUTHORS: JIANG Zhongjun [5592 0112 6874]  
ZHOU Qinglin [0719 1987 3829]

ORG: None

TITLE: "A Discussion on Two Problems in Architectural Design"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 20-23

ABSTRACT: The authors bring up two problems in modern Chinese architectural designs, namely, disregard of mass convenience and inflexible copying of designs. In the former case, the Changsha Railway Station is criticized for its placing the VIP's reception rooms at the center that cut off the traffic of the mass, and the wasting of too much space in many local stadiums for VIP's boxes or platforms. In the later case, rigid copying of the designs of the National Capitol Stadium, the Beijing Library, etc., and some designs abroad in smaller cities, which rendered them impractical, inconvenient and sometimes ridiculous.

AUTHORS: MO Bozhi [5459 0130 3112]  
LIN Zhaozhang [2651 0340 3864]

ORG: None

TITLE: "On the Vernacular Style of New Guangzhou Architecture"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 24-26, 58

ABSTRACT: The authors describe the vernacular style of new Guangzhou architecture that have been developed to adapt to the southern temperate climate, and the influence of Hongkong and Macao, while retaining the principal national architectural style. The characteristics described include light concrete structures, large windows, veranders, contrasting vertical variations and colors, south or southeastern facings, and inclusions of courtyard gardens and landscapings. The examples cited as illustrations are the Yuexiu North Roads' residential complex, the Haizhu Guest House and Exhibition Hall Complex, the North Station Civil Aviation Building and the China Travel Service Building, the Baiyun Guest House Dinning Hall, the Guangzhou Friendship Stores, etc.

AUTHORS: ZHOU Renzhong [0719 0086 1813]  
LIANG Dingsen [2733 7844 2773]

ORG: Chongqing Architectural Engineering College

TITLE: "Cinema at Shifang County"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 27-29

ABSTRACT: The authors introduce the design of the Shifang County Cinema designed by some students of the Chongqing Architectural Engineering College, and constructed by the Shifang County Construction Company. The one-storied cinema occupies an area of 1,439 square meters at a cost of ¥189,800 and a full capacity of 1,227 seats, is noted for its compactness, north-south facing, low cost, space efficient, and high construction quality. Its construction materials adopted, acoustic treatment, coloring, ventilation and heating facilities, and multifarious exits against earthquake and fire are described.

AUTHOR: TIAN Shoulin [3944 1343 2651]

ORG: Shanghai Civil Architectural Design Institute

TITLE: "Design of the Binhai Theatre"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 30-33

ABSTRACT: The author introduces the design and construction of the Binhai Theater that was completed on September 1978. The theater is a subordinate part of the Shanghai Petroleum and Chemicals Plant complex, with a population of 100,000 persons, amidst the residential and commercial area. Designed for all types of dramas, cinema and meetings, the theater occupies an area of 4,923 square meters, has a full capacity of 1,805 audiences, and consists mainly of the main auditorium, balcony, stage, 12 backstage makeup rooms, lobby and others. The materials used, acoustic, lighting, heating, ventilation, fire exits, and other designs are described.

AUTHOR: ZHOU Fangzhong [0719 2455 0022]

ORG: Southwestern Architectural Design Institute

TITLE: "Architectural Design of An Experimental Nursery in Sichuan"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 34-35, 47

ABSTRACT: The author introduces the architectural design of an experimental nursery at Chengdu to accomodate 80-86 infants of 1-3 years of age. The nursery is an extended two-stories fan-shaped structure that occupies an area of 875 square meters, in addition to some surrounding old buildings to be used as administration offices. The ground floor is designed for activity rooms, wash rooms and dinning rooms with corridors adjacent to the yard at the middle. The second floor is designed for bedrooms without restrooms. The two floors are connected by slanting pathways instead of stairways. The yard at the center will include a pool with fountain, playground, and landscaped courtyard.

AUTHOR: ZHANG Xiaosi [4545 1321 1835]

ORG: None

TITLE: "Design of Escape Staircases in Highrise Buildings"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 36-38

ABSTRACT: The author discusses the essentials of the design of highrise escape staircases that include: 1) the planary and vertical plans for escape staircases; 2) the types and forms of escape staircases against both fire and smoke; and 3) the design requirement of escape staircases with regard to fire-resistant structures, windows and openings, dimensions and area, accessory equipment, and the walls of open outdoor escape staircases.

AUTHORS: RONG Jiahua [2837 0857 5478]  
SONG Meiyi [1345 2734 0161]

ORG: None

TITLE: "Design of the Panda House in the Chengdu Zoo"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 39-41

ABSTRACT: The authors describe the architectural design of the Panda House of the Chengdu Zoo that was completed in the summer of 1977. The Panda House occupies a total construction area of 1,000 square meters, water surface area of 1,400 square meters, and outdoor activity ground of 1,125 square meters. The Panda House complex is actually consisted of the Large Panda House, the Small Panda House, with altogether six animal houses, the rest corridors, besides the administration section. The architectural design is aimed at providing an environment of natural bamboo forest that maintains a lower atmospheric temperature without glittering light.



AUTHOR: SHOU Guomin [0719 0948 3046]

ORG: None

TITLE: "Study and Application of Water Storage Roofs"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 42-47

ABSTRACT: The author introduces recent research and applications concerned with the thermal characteristics of rigid water storage roof, the structure of rigid water storage roof and its construction process, and comparison of the technical economic indexes between rigid water storage roof and rigid water proof hollow water storage roof. Because of its growing application as a means of heat insulation in hot season, and heat conservation in cold season, it is reported that since the last decade, the technique has been under intensive research, and is gradually being promoted in southern China, especially in Sichuan province.

AUTHORS: LIANG Hungwen [2733 7703 2429]  
ZHU Chunhua [2612 4783 5478]

ORG: Department of Architectural Engineering, Chinghua University

TITLE: "Interior Design of Museums and Exhibition Buildings Abroad"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 48-53

ABSTRACT: The authors introduces the modern techniques developed abroad in the interior designs of museums and exhibition halls with regard to flexible spacing by means of movable walls, frames, canvasses and supports, and the adoption and control of garret windows for lighting, and improved illumination techniques, with illustrations by photographs from West Germany, USA, United Kingdom, Sweden, Switzerland, Japan, Austria, Belgium, and others.

AUTHOR: TENG Xingyuan [3326 2622 0337]

ORG: None

TITLE: "The Architecture of Minoru Yamasaki"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 54-58

ABSTRACT: The author introduces the achievement of the great contemporary architect, Minoru Yamasaki, and his architectural philosophy.

AUTHOR: ZHENG Guangfu [6774 0342 1788]

ORG: None

TITLE: "The Siting and Planning of Suburban Hotels"

SOURCE: Beijing JIANZHU XUEBAO [Architectural Journal] No 4 Jul 79  
pp 59-63

ABSTRACT: The author introduces the fast developing suburban hotel enterprises abroad with regard to their types, selection of sites according to scenic spots and sport activities availability, and their planning on the basis of natural environment, scattering, and communication and supply facilities, as a reference to their development in China.

AUTHOR: LI Qihu [2621 0796 5706]

ORG: None

TITLE: "Underwater Detective--Sonar"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 1-3

ABSTRACT: The term sonar began to be used in World War II. It is the equivalent of underwater radar, but instead of electromagnetic wave, it uses underwater sound wave to determine the existence, location, and type of materials in the ocean; it may also be used for underwater communication. This paper describes the structure and theory of sonar, its application in submarine warfare, in fishing, in navigation, and in the development of resources of the ocean floor. The history of sonar technology, from the surface reflection type to the so-called "search light type" of the 1960's, to the sonar after the 1960's, utilizing computer technology for signal processing is briefly discussed. The future possibility of creating nonlinear sonar is also briefly mentioned.

AUTHOR: TU Hengcang [1458 5683 3318]

ORG: None

TITLE: "Overload Protection for Series Type Transistor Stable Voltage Power Source"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 4-6

ABSTRACT: The series type transistor stable voltage power source is a common direct current stable voltage power source. With this type of power source, the regulator and the load is a series; therefore, if the load current increases the current of the regulator increases also. The melting time of the common fuse is too long to protect the regulator from being burned out whenever the load increases. This paper introduces an electronic circuit to protect the regulator from overload. Detailed circuit diagrams are given to explain this measure.

AUTHOR: (1) None  
(2) YANG Zetian [2799 3419 3944]  
(3) None

ORG: (1) Harbin Radio Sixth Plant, Heilongjiang; (2) Mudanjiang Radio Plant, Heilongjiang; (3) Mudanjiang Electronic Instrument Plant, Heilongjiang

TITLE: "Brief News in Electronics"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 -p 7

ABSTRACT: Three items are included in the paper: (1) SJY-1 Leak Detecting Instrument: It was made through the cooperative effort of Harbin Radio Sixth Plant, College of Ship Engineering, City Water Company, Institute of Urban Construction; and Lyuda City Water Company. Using electronic technology, it can locate site of leak in underground water pipes. (2) HTQ Infrared Hot axis Detector: It is made by Mudanjiang Radio Plant as a railway safety instrument, to detect overheating of axis due to abnormal friction with malfunctioning parts. It can be used when the train travels between 5-70 km per hour. It will send automatic warning signals to the train. (3) STS-1 Double-Head Color Scanner: It is made jointly by Mudanjiang Electronic Instrument Plant and Harbin University of Medicine, being an electronic instrument using isotopes for early diagnosis of cancer. It has a permanent program, with a small special electronic computer for data processing.

AUTHOR: ZHANG Ming [1728 2494]

ORG: Beijing Television Plant

TITLE: "Several Understandings in Reconstructing the 23 cm Television Receiver"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 8-10

ABSTRACT: In recent years, a large number of 23 cm television receivers were produced in China. These televisions are small and consume very little electricity; therefore, they are suitable for home use. The screen of these receivers is very small, however. Many people hope to find a way of changing a few components to make this type of television into a 31 cm one. Through experimentation, the author have found it possible to realize this dream. The reconstructing procedure is explained in detail in the paper.

AUTHOR: TONG Lianghua [4547 5258 7520]  
JIANG Yongzhou [1203 3057 0719]  
LI Pingxin [2621 1627 2450]

ORG: None

TITLE: "Selection of R-C for Field Integral Circuit"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 11-12,10

ABSTRACT: In television field scanning circuit, the field integral circuit has two major functions. One is for frequency separation. The other is to supply a relatively ideal synchronous pulse to the field oscillator to cause the field oscillator frequency to synchronize with the field synchronous signals. In order to accomplish these two jobs, a suitable time constant must be selected for the field integral circuit. This paper explains the suitable way of selecting the time constant. The authors' experience in the matter in the process of designing the Haiyan 12JD-A television receiver is also given to illustrate the problems involved.

AUTHOR: FANG Xi [2455 6932]

ORG: None

TITLE: "Classification and Characteristics of Power Amplification Circuits"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 14-17

ABSTRACT: Using electron tube circuits as examples, this paper discusses the classification and characteristics of power amplifier circuits and describes concretely the method of recognizing each type of power amplifier from the circuit point of view and the problems to be emphasized when each of the types is adopted. The facts and reasoning given in the paper are applicable for transistor amplifiers as well.

AUTHOR: ZHENG Hao [6774 3185]  
WEI Hua [7614 5478]

ORG: None

TITLE: "Carrying out Rebroadcasting With Mirror Image Circuit"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 16-17

ABSTRACT: In case of live broadcasting of a meeting, if the the site is relatively far from a broadcasting station, a special line often has to be set up between the conference site and the broadcasting station. This is both uneconomical and time consuming. This paper introduces a mirror image circuit, requiring no special wire to connect the conference site with the broadcasting station. The theory of the circuit, the diagram depicting the installation, and the method of selecting suitable parts are explained.

AUTHOR: TIAN Jingin [3944 6651 0530]

ORG: None

TITLE: "Theory and Work Process of Self Phase Reversal Push Pull Amplifier"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 18-19

ABSTRACT: Among the currently popular push pull circuits with no transformer, two transistors (PNP and NPN) of different conductivity must be paired to form the push pull tube. The materials of the two tubes must be the same, and their  $\beta$  value and other parameters must be close if the output and distortion are not to be affected. This paper introduces a self phase reversal R C push pull circuit. It has the advantage of using either two PNP or two NPN tubes. The  $\beta$  value of the two tubes does not have to be the same. It is simple to regulate as well. The work theory and the actual circuit are explained. This paper is to be continued.

AUTHOR: SHENG Huiquan [4141 1920 2164]

ORG: None

TITLE: "Process of Making an OCL High Fidelity Audio Amplifier (Continued)"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 pp 20-21, 32

ABSTRACT: This installment of the paper includes the following chapters:  
(3) Selection of components; (4) The quality of assembly must be emphasized;  
(5) Method of regulating (a) the power source portion; (b) the main amplifier;  
(c) The first stage power source; (d) the preamplifier. The maximum distortion of this instrument is 0.8 percent if the output capacity is 16 w.



AUTHOR: None

ORG: None

TITLE: "Front, Inside Front, Back, and Inside Back Covers"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, Oct 78 front, inside front, back, inside back covers

ABSTRACT: The front cover is a photo of China's first floating oceanographic remote control weather station, successfully made by Qingdao Institute of Metrology. It can automatically test the wind direction, wind speed, temperature, air pressure, water temperature and flow direction of the surface and deep layers, etc. The inside front cover has four photos depicting: (1) Super-conduction cable, capable of being used under the low temperature of -260°C, being a material for making basic particle accelerator. (2) A gallium arsenide luminous diode: When it is joined with photo-conducting fiber, it forms the light source for photo-communication. Names of persons are not given. (3) New process of injecting ions into machine for surface analysis of semiconductors for improving the quality of semiconductors thus manufactured. (4) After half a year's efforts, two types of integrated circuits of the quality level of the best in the world have been successfully made. The above four items are the fruits of research of Shanghai Institute of Metallurgy.

[continuation of WUXIANDIAN No 10 1978 front, inside front, back, inside back covers]

The back cover is a photo depicting a harbor radar navigation guidance station built by the workers of Qingdao Bureau of Harbor Affairs, using old and used equipment. It can guide ships safely, quickly, and precisely into the harbor under the condition of dense fog. The inside back cover has photos of ten audio transmission instruments made in China, and a table listing their major technical indices.

AUTHOR: HUANG Dingguo [7806 1353 0948]

ORG: Wuhan Academy of Post and Telecommunication Sciences, Ministry of Post and Telecommunications

TITLE: "Laser Optical Fiber Communication"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 pp 1-3

ABSTRACT: The advantages and the current status of laser optical fiber communication technology are explained. The extremely high frequency of laser, about one thousand times higher than microwave, allows the possibility of transmitting ten million television programs simultaneously. Aside from the extremely large volume of signal transmission, optical fiber communication requires only ultra-pure quartz glass and tons and tons of colored metals currently consumed for electrical cable may be saved. The interference and corrosion resistant properties of optical fiber are also discussed. At present, after integrated circuits, scientists are studying the possibility of integrating optical components onto a small chip to produce even better second generation optical cable communication systems.

AUTHOR: XU Zhipang [1776 3112 6721]

ORG: Shanghai Semiconductor Components Sixteenth Plant

TITLE: "TTL Integrated Circuit AND NOT Gate Circuit (Continued)"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 pp 3-5

ABSTRACT: In this installment, the paper continues to explain the major property curves, including  $V_{in} \sim V_{out}$ ,  $I_{OL} \sim V_{OL}$ ,  $I_{OH} \sim V_{OH}$ , and  $V_{in} \sim I_I$ , and the various forms of input and output connections.

AUTHOR: LIANG Hua [2733 5478]

ORG: None

TITLE: "Simple Methods of Testing TTL AND NOT Gate Circuits"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 p 6

ABSTRACT: Among TTL integrated circuits, the AND NOT gate is the most basic and most common components. This paper introduces the method of using an all purpose meter to identify and to determine the quality of an AND NOT gate circuit and the method of using a JT-1 transistor characteristic display cathode-ray oscillograph to observe directly the characteristic curve of an AND NOT gate circuit in seprate sections.

AUTHOR: None

ORG: Television Service Department, Central Bureau of Broadcasting Affairs

TITLE: "Reconstructing Import Television Receivers"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 pp 8-11

ABSTRACT: Due to the differences in the frequency range, picture and secondary audio frequency, etc. television receivers purchased from a foreign country must be reconstructed before they can be used to receive programs broadcast in China. The parts requiring adjustment commonly include the high frequency tuner (commonly called the high frequency head), the audio intermediate frequency and the picture intermediate frequency tuning circuits. Methods of changing these parts to meet the requirements in China are introduced. Frequency differences of Chinese, Japanese, and Western European television systems are listed in a table in the paper.

AUTHOR: BEI Tian [0554 3944]

ORG: None

TITLE: "Analysis of Television Receiver Circuits (3): Video Frequency Detection and Amplification Circuits of Joint Design 31 cm Television Receiver"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 pp 11-13

ABSTRACT: The video frequency detection circuit and the video amplification circuits of the National Joint Design 31 cm black and white television receiver are described.

AUTHOR: LI Yingkai [2621 2019 2818]

ORG: None

TITLE: "Simple Design of OCL Circuit (Continued)"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 pp 14-16

ABSTRACT: This installment includes sections on (4) Calculation of the excitation stage ( $BG_3$ ); (5) Calculation of differential amplification stage ( $BG_1, BG_2$ ); (6) Calculation of other components to complete the chapter before starting a new chapter on calculation illustrations. The new chapter is divided into the following sections: (1) Determination of voltage of the power source; (2) Calculation of the output portion; (3) Calculation of mutual complementary portion; (4) Calculation of excitation stage; (5) Calculation of differential amplification stage; (6) Calculation of other components.

AUTHOR: WEI Ming [0521 2494]

ORG: None

TITLE: "Variable Capacitor Tube Electronic Tuning (Continued)"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 pp 19-21

ABSTRACT: This installment of the paper continues to discuss (4) Coordinating into a compatible group; (5) Method of testing to complete the chapter before starting a new chapter on (II) Electronic Tuning Circuit, which includes sections on (1) Circuit characteristics; and (2) Measures to improve the circuit. (III) Samples of electronic tuning receivers, (III) Development tendency of electronic tuning in China and abroad are the two remaining chapters to complete this installment.

AUTHOR: SHEN Rongzhang [3088 2837 4545]

ORG: None

TITLE: "Property Parameters of Several Ceramic Filters: Explanation of Inside Back Cover"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 p 25, inside back cover

ABSTRACT: On the inside back cover of this issue of the journal, there is a table listing the property parameters of several ceramic filters and related diagrams of the filters produced by the Shanghai Radio First Plant. The structures and properties of the LTX<sub>1</sub> (including LTX<sub>1A</sub> and LTX<sub>1B</sub>), the LT465, the LTB10.7, and the LT465H ceramic filters are further explained in this paper.

AUTHOR: None

ORG: None

TITLE: "Front, Inside Front, and Back Covers"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 5, May 79 front, inside front, back covers

ABSTRACT: The front cover of this issue of the journal is a photo depicting the process of pulling and manufacturing the optical conduction fiber used in optical communication. The inside front cover has four photos depicting the successful experimental production of China's first set of intercom using optical conduction fiber communication system: (1) Transmitting television and telephone; (2) Transmitting written telephone; (3) Facsimile transmission; (4) Transmitting numerical data. The back cover contains drawings of an optical communication system depicting the various steps and components from transmission to reception.

AUTHOR: HE Yuzhen [0149 3768 3791]

ORG: Institute of Computers, Chinese Academy of Sciences

TITLE: "Microcomputers--A New Team in the Realm of Computers"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 1-3

ABSTRACT: A new team, the microcomputers, made their appearance in the realm of computer science in the early 1970's. They are small and inexpensive. At present each costs less than a hundred U.S. dollars and the price is expected to drop to 3-5 U.S. dollars in the 1980's, while a medium capacity microcomputer can perform one hundred thousand computations per second, twenty times the capacity of the world's first computer. This paper explains briefly the micro-processor, which is the nucleus of the microcomputer, the other parts of a microcomputer, the history of development and the various applications of microcomputers.

AUTHOR: DAI Xitong [2071 1585 0681]

ORG: None

TITLE: "Application of Temperature Sensitivity Characteristic of P - N Node of Transistors in Low Temperature Measurement"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 4-5

ABSTRACT: The P-N node of transistors is very sensitive to temperature. Ordinary, when in the designing of transistor amplifier circuit, all sorts of ways must be found to compensate for the characteristic drift caused by temperature variation. The author and colleagues utilized this temperature sensitivity to make an instrument for measuring low temperature to the range of  $-150 \sim -200^{\circ}\text{C}$ . Either silicon or germanium diode and silicon triode may be used for this purpose. The  $I_{\text{cbo}}$  of germanium triode is too great and the stability is poor; therefore, it is not suitable. Two examples of this application are included in the paper.



AUTHOR: (1) LYU Guangping [0712 1684 1627]  
(2) TANG Guiliang [3282 6311 5328]  
(3) LYU Guangping [0712 1684 1627]  
(4) YI Min [0001 3046]

ORG: None

TITLE: "(1) High Input Impedance Low Noise Preamplifier; (2) Electronic Input Selector; (3) Timer; (4) Matching of Mutual Compensatory Pair"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 5-6

ABSTRACT: (1) A diagram is given to describe a method of increasing the input impedance. The input impedance of the preamplifier is  $10\text{ M}\Omega$ , and the noise voltage is  $0.54\text{ }\mu\text{V}$  ( $\Delta f = 10000\text{ Hz} \sim 200\text{ Hz}$ ). (2) In order to eliminate the distance between the input selection switch and the signal input jack of an ordinary loudspeaker, which increases the possibility of noise interference, the author and colleagues adopted an electronic input selector and placed it near the input jack to cause the audio frequency input signals to enter the amplifier through the selector directly. (3) A timer circuit is described, with the delay time  $T$  determined by the time constant  $R_T C_T$ . When  $R_T = 1\text{ M}\Omega$ ,  $C_T = 50\text{ }\mu\text{f}$ , the delay time is about 2 minutes. (4) A diagram is given to depict a circuit which may be used to match a power compensating pair without the danger of damaging the tubes.

AUTHOR: WANG Dunshi [3769 2415 6108]

ORG: None

TITLE: "Simple Trigger Switches"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 8-11

ABSTRACT: At present, some television receivers have no button to push and no dial disk to turn. To change a channel or program, the viewer needs only touch the numbered panel with his finger. The number touched will light up and the desired program is obtained. This touch type program selector is made by joining a trigger circuit with an electronic high frequency tuning head. The structure of this trigger switch is explained. The work theory, the structure, and the circuits of the component type trigger switch and the integrated circuit type trigger switch are described separately for the reference of the readers who wish to make the touch type switch in their spare time.

AUTHOR: None

ORG: Television Service Department, Central Bureau of Broadcasting Affairs

TITLE: "Reconstructing Import Television Receivers (Continued)"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 11-13

ABSTRACT: This installment of the paper contains the two chapters on reconstructing the audio intermediate frequency and the picture intermediate frequency of Japanese or Western European make television sets to enable them to receive television programs in China. Procedures for converting the West German make 5010 color television set, the Japanese TR-123C black and white set, the Japanese CNP-865 color set, and the Japanese Sony TV-14 G television set are described for the purpose of illustrating the discussion. Possible problems are mentioned.

AUTHOR: WEN Shang [2429 1424]

ORG: None

TITLE: "Combining Several Loudspeakers and Frequency Division"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 14-15, 18

ABSTRACT: Although large speakers have good quality low sound, the high sound is poor. It is really very difficult to obtain good quality sound in all the range from a single speaker. Several techniques of combining several speakers to obtain good quality sound are recommended, including adding auxiliary high sound speakers and adopting speaker frequency division net. This paper is to be continued.

AUTHOR: JUN Tao [0193 3447]

ORG: None

TITLE: "Integrated Circuit Radio Receiver"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 20-21

ABSTRACT: In radio technology, electron tubes first replaced crystal receiver before electron tubes were again replaced by transistors. Today, almost all radios are transistorized but with the development of integrated circuits, sooner or later, transistors will necessarily be made obsolete. If the past changes may be called forward leaps, the next step would have to be called a technical revolution. Aside from the linear circuits, integrated circuit will bring digital circuit to radio. The frequency indicator will be precise. There will be digital clock radios, integrated circuit scanning radios, radio receiver and walkie-talkie combination, or radio receiver and recorder combination, etc. This paper introduces the structure and the circuit of the radio receiver only, using two types of integrated circuit radios made in foreign countries as examples.

AUTHOR: HUANG Minning [7806 2404 2494]  
PAN Jian [3382 0256]

ORG: None

TITLE: "Model Light-Controlled Automobile"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 6, Jun 79 pp 22-24

ABSTRACT: At an exhibit [the date and location of which are not given in the paper.] the viewers were extremely captivated by the performance of the model automobile on a display table. It traveled along a white line about 8 cm wide, which was painted on a black colored road surface. When the white line curved, the car turned automatically. The turn signal came on, so was the horn. When the guide touched it with a stick, it stopped automatically. Many people, after seeing the exhibit, want to know the theory and structure of the movement of that automobile. The work theory, the selection of components, and the assembly and adjustment of this light-controlled model car are introduced in the paper.

AUTHOR: ZHAO Baohua [6392 0202 5478]

ORG: None

TITLE: "How to Treat the Unused Input Terminal of TTL AND NOT Gate"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7, Jul 79 p 3

ABSTRACT: When we apply digital integrated circuits, some input terminals are often not needed. Two theories should be kept in mind concerning these terminals: (1) The work logic of the circuit must not be altered; (2) The circuit should be made to work stably and reliably. Three techniques of handling these unused terminals according to the above theories are described. These three techniques are suitable for logic circuits of strict requirements and combination digital and amplification circuits.

AUTHOR: WANG Guoding [3769 0948 1353]

ORG: Shanghai Components Fifth Plant

TITLE: "Application of 5G28 in Audio Frequency Equipment"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7, Jul 79 pp 4-6

ABSTRACT: 5G28 is an integrated circuit for single chip computation amplifier. It has the characteristics of high input impedance and relatively fast conversion rate. A diagram is given to demonstrate the internal electrical theory of the circuit. Using this integrated circuit as an example, the paper explains some simple applications of these computation amplifiers in the realm of audio frequencies. The 5G28 is a relatively simple circuit. In principle, other computation amplifiers are also suitable for these applications, so long as these products have a sufficiently wide frequency band.

AUTHOR: None

ORG: B314 Designing Group, Dongfeng Television Receiver Plant

TITLE: "Kunlun B314 Integrated Circuit Black and White Television Receiver"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7 Jul 79 pp 8-10, inside front, inside back, back covers

ABSTRACT: The B314 is an experimental model 31 cm black and white television receiver made by the Dongfeng Plant using integrated circuits. The major properties, the structure and characteristics, and the work process are given in the paper. A diagram depicting its printed circuit is reproduced on the inside front cover of the issue; its complete circuit diagram is given on the inside back cover; a photo of the television receiver set and two photos of its internal chassis are given on the back cover.

AUTHOR: AN Yongcheng [1344 3057 2052]  
ZHU Dehui [2612 1795 6540]

ORG: None

TITLE: "Circuit Analysis of Television Receivers: Automatic Gain Control Circuit of Joint Design 31 cm Television Receiver"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7, Jul 79 pp 10-13

ABSTRACT: The automatic gain control circuit (AGC) can automatically adjust the gain of the picture pass channel in the television receiver with the variation of strength and speed of the incoming signals to guarantee the wave form and amplitude of the output video frequency signals to remain basically invariable. This paper discusses, in separate sections, the basic requirements of the AGC circuit, selection of its form, analysis of its peak value. The paper is to be continued.

AUTHOR: WEN Shang [2429 1424]

ORG: None

TITLE: "Combining Several Loudspeakers and Frequency Division (Continued)"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7, Jul 79 pp 14-16

ABSTRACT: If the high and low speakers have different impedance, the output power of the speaker combination will be different in the different frequency bands. In order to balance the sound, an attenuator may be connected at the terminal of the high speaker. The paper proceeds to describe various methods frequency division for these speakers.

AUTHOR: CAO Songqing [2580 2646 7230]

ORG: None

TITLE: "Equivalent Loudness Audio Volume Control Circuit"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7, Jul 79 pp 17-18

ABSTRACT: The audio volume control potentiometer of an ordinary audio frequency amplifier is in fact a variable resistance voltage dividing attenuator. The amount of attenuation is the same for all frequency signals. If the volume is turned down, signals of all frequencies are greatly attenuated. Due to the special characteristic of the human ear, the low sound appears to be much lower while the high sound is not as clear as they should be. The equivalent loudness audio volume control circuit is to cause the low, intermediate, and high sound to be equally clear for the human ear no matter whether the volume is turned up or down. The circuit for accomplishing such high fidelity is described.

AUTHOR: WANG Gongxing [3769 1872 5887]

ORG: Designing First Group, Shanghai Radio Second Plant

TITLE: "Hongdeng 733-1, 14-tube, 5-band Semiconductor Radio Receiver"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 7, Jul 79 pp 19-21, 32, front cover

ABSTRACT: This radio receiver is made for the use of distant border regions. It has high sensitivity and selectivity, and relatively good sound quality and a large output power. It has one intermediate wave band and four short wave bands. Its major property indices and its circuit characteristics, including its tuned high frequency amplifier, its input circuit, and its high frequency gain control circuit are introduced. This paper is to be continued. The front cover of this issue is a photograph of a group of radio astronomical telescope antennas for astronomical observation. The location of these antennas is not given.

6168

CSO: 4009



AUTHORS: HUANG Zhenkun [7806 2182 0981]  
LIN Zuxiang [2651 4371 8994]  
YAN Dongsheng [0917 2639 3932]

ORG: All of Shanghai Institute of Silicates, Chinese Academy of Sciences

TITLE: "Studies on the Phase Equilibrium Relationships and the Crystal Chemistry of  $R_2O_3$  (R: La, Nd, Gd, Ho, Yb)- $TiO_2$  Systems. I. Phase Equilibrium Relationships of  $R_2O_3$  (R: La, Nd, Gd, Ho, Yb)- $TiO_2$  Systems"

SOURCE: Beijing GUI SUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 pp 1-10

TEXT OF ENGLISH ABSTRACT: The phase equilibrium relationships of  $R_2O_3$  (R: La, Nd, Gd, Ho, Yb)- $TiO_2$  systems were investigated. Three compounds with compositions in ratios of  $R_2O_3:TiO_2$  of 1:1, 1:2 (all congruently melting) and 2:9 (incongruently melting) were identified in  $La_2O_3$ - $TiO_2$  and  $Nd_2O_3$ - $TiO_2$  systems. The compounds with the same oxide ratios have similar structures. In the  $Gd_2O_3$ - $TiO_2$  system, the 2:9 compound has not been found, but  $Gd_2TiO_5$  (incongruently melting) and  $Gd_2Ti_2O_7$  (congruently melting) are still present. Both  $Ho_2O_3$ - $TiO_2$  and  $Yb_2O_3$ - $TiO_2$  systems

[Continuation of GUI SUANYAN XUEBAO Vol 7 No 1. Feb 79 pp 1-10]

contain only a limited region of face-centered cubic pyrochlore solid solution, which extends with a composition range of 40~67 mol.%  $TiO_2$  with a general formula of  $R_{2+x}Ti_{2-x}O_7 - \frac{x}{2} \square \frac{x}{2}$  ( $0 \leq x \leq 1$ ). This solid solution is continuous at high temperatures, but separates into two face-centered cubic phases which coexist in a narrow region at low temperatures. The solidus and liquidus temperatures were determined by the quenching method. Tentative phase diagrams for the  $Nd_2O_3$ - $TiO_2$ ,  $Ho_2O_3$ - $TiO_2$ , and  $Yb_2O_3$ - $TiO_2$  systems were presented.

This article is the main results of the postgraduate thesis completed in 1965.

This paper was received for publication on 1 September 1978.

AUTHORS: ZHANG Gancheng [1728 1626 1004]  
CHEN Xuexian [7115 1331 6343]  
WU Daohuai [0702 6670 2037]  
XIAO Jianing [5618 1367 1380]  
CHEN Jufang [7115 5468 5364]  
ZHANG Fuzhen [1728 4395 3791]  
SHENG Liangen [4141 6647 2704]

ORG: All of Shanghai Institute of Silicates, Chinese Academy of Sciences

TITLE: "A Study of Photo-induced Changes of Optical Properties and Holographic Parameters in the Non-crystalline Film of  $As_2S_3$ "

SOURCE: Beijing GUI SUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 pp 11-17

TEXT OF ENGLISH ABSTRACT: The changes of the transmission and refractive index of non-crystalline film of  $As_2S_3$  under the radiation of argon ion laser and the various holographic parameters have been studied. In order to develop the application of materials in micro-holographic storage, experiments of temperature, humidity, read-out life and dark storage time with respect to the  $As_2S_3$  films inscribed with holograms are performed.

[Continuation of GUI SUANYAN XUEBAO Vol 7 No 1, Feb 79 pp 11-17]

This paper was received for publication on 10 October 1978.

Thanks are expressed to Zhang Yufeng [1728 3768 1496] of this institute, and Qiu Xiaojing [6726 2556 4552] and Hu Yuhui [5170 3022 1979] of the Shanghai Measure Bureau for active coordination in the spectrographic analysis.

Min Sigui [7036 0843 2710] directed the research.

AUTHOR: SU Lianghe [5685 5328 6378]

ORG: Wuhan Geological College

TITLE: "Petrology and Steel Industry"

SOURCE: Beijing GUISUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1,  
Feb 79 pp 18-23

TEXT OF ENGLISH ABSTRACT: In many respects, the theories and methods of modern petrology can be utilized in promoting the steel manufacture. In the present paper, the relation between the chemical composition and the durability of dolomite refractories in service at 1600°C is discussed.

This paper was received for publication on 12 May 1978.

Thanks are expressed to You Guocheng [6735 0948 1064] of Loyang Refractory Materials Institute, and Song Zhentai [1345 6966 3141], Zhou liye [0719 4539 2814] and Cui Shuxian [1508 0647 6343] of Beijing Steel Institute for suggestions.

All the data used in this research are provided by various Iron and Steel Mills.

AUTHOR: CHEN Shiping [7115 1102 5493]

ORG: Shanghai Institute of Silicates, Chinese Academy of Sciences

TITLE: "The Heating Behavior of Several Ancient Glazes"

SOURCE: Beijing GUISUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1,  
Feb 79 pp 24-34

TEXT OF ENGLISH ABSTRACT: 28 samples of lead oxide glaze, calcium oxide glaze and red glaze from Han to Qing Dynasties were studied, and their softening points determined. It can be asserted that the "Qing Hua" (underglaze blue) not only colored the surrounding glaze, but also preferably stained the anorthite crystalline at the site to deep blue. On heating the "Qing Hua", redissolution of the anorthite crystals caused slight diffusion of the blue color. After cooling, anorthite recrystallized and aggregated on the surrounding undissolved blue pigment. The prismatic anorthite crystallines in Ge Yao type glaze excavated from the Great Capital of Yuan Dynasty were very liable to redissolve after being heated, and required longer period of time and particular technique to recrystallize them. The physico-chemical characteristics of the celadon glaze predetermined that the glaze could hardly occurred into emulsion form.

[Continuation of *GUISUANYAN XUEBAO* Vol 7 No 1, Feb 79 pp 24-34]

This paper was received for publication on September 1978.

Chen Xianqiu [7115 7359 3061] directed this research. Jiang Lingzhang [1203 6875 4545], Shao Kangqing [6730 1660 3237], Gu Zujun [6253 4371 0193] and Chen Peiqi [7115 0160 3825] also participated in the research.

AUTHORS: TANG Mingshu [0781 2494 6615]  
YUAN Meixi [5913 5019 8962]  
HAN Sufen [7281 5685 5358]  
SHEN Xing [3088 5281]

ORG: All of Nanjing Chemical Engineering College

TITLE: "The Crystalline State of  $MgO$ ,  $FeO$  and  $MnO$  in Steel Slag and the Soundness of Steel Slag Cement"

SOURCE: Beijing *GUISUANYAN XUEBAO* [Journal of Silicates] Vol 7 No 1, Feb 79 pp 35-46

TEXT OF ENGLISH ABSTRACT: The crystalline state of  $MgO$ ,  $FeO$  and  $MnO$  in converter slag, open-hearth slag and electric furnace slag from steel plants were studied, and their reactivity with water under various autoclave conditions (at the temperature up to  $330^{\circ}C$  corresponding to the pressure of 127 Atm.) were determined. The results show that  $MgO$  presenting a solid solution with  $FeO$ , and  $MnO$  is much more inert than pure periclase, and will not cause unsoundness. It is practical for using steel slag to make steel slag cement, or as cement additives, and as aggregates of concrete.

[Continuation of GUISUANYAN XUEBAO Vol 7 No 1, Feb 79 pp 35-46]

This paper was read at the Joint Annual Conference of the Chinese Silicates Society and the Shanghai Silicates Society on November 1978.

Wang Defa [3769 1795 4099], Qiu Tianmin [6726 3944 3046] and Zhang Yuzhen [1728 1342 7201] also participated in the research.

Thanks are expressed to the National Capital Steel Slag Cement Plant, the Shanghai Construction Office, the Shandong Construction Office, the Shanxi Construction Office, the Baotou Steel Central Laboratory, and the Angang Steel Institute for provision of steel slag samples and other materials, to Ren Pingshi of the Metallurgical Research Institute for participation in part of the petrographic experiments, and to the Nanjing Steam Turbine Plant for assistance in the scanning electronic microscope research.

AUTHORS: CHENG Changyin [4453 7022 5593]

ORG: Sichuan Qingguang Electronic Device Plant

TITLE: "The Structure and Properties of Glasses in the Ternary System PbO-Al<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub>"

SOURCE: Beijing GUISUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 pp 47-57

TEXT OF ENGLISH ABSTRACT: The range of glass formation and the thermal and electrical properties of PbO-Al<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub> system were investigated. The results demonstrate that Pb<sup>2+</sup> ion may be the carrier during the process of electrical conduction, and the glass conductivity depends chiefly upon the concentration of lead ion and the structural continuity of the network, while the thermal properties are correlated with B<sup>3+</sup> coordination and binding of its constitutional network. The results also show that the formation of BO<sub>3</sub> or BO<sub>4</sub> chiefly depends upon the concentration of PbO and Al<sup>3+</sup> ions, for the former will give up the free-oxygen and the later will gain preferably the free-oxygen. When  $\frac{\text{PbO}}{\text{Al}_2\text{O}_3} > 1$ , the Al<sup>3+</sup> ions are fourfold coordination, and when the content of PbO is high, PbO may be the glass-former, and goes into the network.

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According to the high electrical insulation and low melting temperature, these glasses have been applied to develop various types of solder glasses for electronic devices.

This paper was received for publication on 14 July 1978.

Lin Changfu [4453 7022 5593], Wu Daizeng [0124 0108 1073], Deng Jingzeng [6772 2529 6966], Tang Peixun [0781 0160 8133], Liu Guangquan [0491 0342 0356], Ho Lianwei [0,49 6647 4850] and Ge Rongtian [5514 2837 3944] of the plant also participated in the research.

AUTHORS: XUE Jungan [5641 0689 3771]  
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ZHAO Yuping [6392 1342 1627]  
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ORG: All of Institute of Cement, Construction Materials Research Institute

TITLE: "An Investigation on the Sulfoaluminate Expansion of Cement-stone, and Also on the Characteristics of Sulfoaluminate Expansion at the Under-saturated Concentration of CaO in Liquid Phase"

SOURCE: Beijing GUISUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 pp 58-74

TEXT OF ENGLISH ABSTRACT: The history of the development of expansive and self-stressing cement and the investigation of sulfoaluminate expansion of cement-stone were reviewed. Conclusions on the study of sulfoaluminate expansion of cement-stone made by the Physico-chemical Department of the Cement Research Division from the beginning of the sixties were presented. They are: 1. Ettringite formed at the early hardening stage of cement paste cause the development of the skeleton of strength, whereas those

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formed after cement-stone acquiring a definite strength will then produce expansion, irrespective of the source of  $Al_2O_3$ , CaO,  $SO_3$  or whether the CaO concentration in the liquid phase is saturated or not. 2. The self-stressing value resulted from sulfoaluminate expansion and the structure of the cement-stone is related to the following conditions: the shape of ettringite (depending on the CaO concentration in liquid phase), their quantity, the strength of the cement-stone when forming into ettringite, the mode of formation, the quantity and for of gel phase produced at the same time as with the ettringite and the restraint condition of concret. 3. At the undersaturated concentration of CaO in liquid phase of the cement-stone, ettringite with the characteristic of lower expansion is formed from some aluminates, and hydroalumina gel is produced under the same reaction. These result in the micro-structure of cement-stone denser, the developement of strength and expansion more consistant and the ratio of free expansion and its restraint expansion lower. All of these are beneficial to provide high self-stressing value and low gas-permeability of self-stressing cement concrete. Based on the above points of view, the phenomena and mechanism of expansion related to the formation of ettringite are discussed. The prospects that the value of chemical prestress will get close by degrees to the value of mechanical prestress, and

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the low gas-permeability cement products could be made are expected.

This paper was read at the Joint Annual Conference of the Chinese Silicates Society and the Shanghai Silicates Society on November 1978.

Thanks are expressed to Chief Engineer Wu Zhongwei [0702 0022 0251] for active support, and to Wei Yundo [7614 6653 6995] for suggestions of corrections.



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ORG: Institute of Geology, Chinese Academy of Sciences

TITLE: "Determination of Silicon in Minerals by Silicomolybdate Blue Spectrophotometry"

SOURCE: Beijing GUI SUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 pp 75-81

ABSTRACT: The author reports the adoption of hydrogen peroxide fusion in platinum crucible at 510°C for 10-15 minutes for fast decomposition of silicate minerals, and then apply the silicomolybdate blue spectrophotometry for the determination of silicon. The optimal conditions established are 0.05-0.20N HCl, ethyl alcohol as stabilizer, ascorbic acid to reduce silicomolybdate yellow complex, and EDTA to mask zirconium dioxide. The method is claimed to be simple, fast, accurate and stable, and can also be applied to samples that contain 0.0x-xx% silicon.

This paper was received for publication on 26 December 1978.

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WANG Jiafan [3769 0163 0028]

ORG: Wang Chengyu of Dalian Light Industry College, and Wang Jiafan of Ninth Tianjin Glass Plant

TITLE: "A Study on Glass Decoloring"

SOURCE: Beijing GUI SUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 pp 82-88

ABSTRACT: In a comparative review on the accuracy of the methods adopted by the various glass plants in China to express the decoloring results, and the higher doses of Se, Co and Se/Co physical decoloring agents and As<sub>2</sub>O<sub>3</sub> chemical decoloring agents used in China in comparison to those generally used abroad, the authors advocate the unified adoption of the Uniform Chromaticity Scale (UCS) to express the decoloring results, a drastic reduction of the Se, Co and Se/Co physical decoloring doses and As<sub>2</sub>O<sub>3</sub> chemical decoloring doses, and an adjustment of the decoloring doses proportional to the contents of Fe<sub>3</sub>O<sub>4</sub> in the raw materials.

This paper was received for publication on 28 December 1978.

AUTHOR: None

ORG: This Journal

TITLE: "1978 Annual Conference of the Chinese Silicates Society and the Shanghai Silicates Society Convened at Shanghai"

SOURCE: Beijing GUI SUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 p 98

ABSTRACT: This article reports the convening of a joint Annual Conference of the Chinese Silicates Society and the Shanghai Silicates Society at Shanghai from 24 November to 1 December 1978, and attended by almost 300 representatives from various departments of the Chinese Academy of Sciences. Following a review on the advances and achievement of both societies in recent years, 230 papers out of the more than 500 papers received were read and discussed, and some special reports reported. In proclaiming the restoration of the National Administrative Committee, and revision of the societies' regulations, 10 special committees were established, and the administrative committee officers elected. The conference also passed an academic activities plan for 1979, and decided to convene the Third National Silicates Society Congress in 1980.

AUTHOR: None

ORG: This Journal

TITLE: "Restoration of the Various Local Silicates Societies"

SOURCE: Beijing GUI SUANYAN XUEBAO [Journal of Silicates] Vol 7 No 1, Feb 79 p 98

ABSTRACT: This article reports the official restoration of the Silicates Societies and their activities in Beijing, Tianjin, Shanghai, Guangdong, Guizhou, Shanxi, Zhejiang, Liaoning, Hebei, Hunan, Chungqing, Dalian, Wushun, Chichihar, Benchi, Dandong, and Bengbu by the end of 1978. Those still under preparation include Hubei, Jiangxi, Anhui, Shensi, Jiangsu, Guangxi and Jingdezhen.

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